

STANDARD OPERATING PROCEDURES

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THE OPERATION OF THE JEROME MODELS 411 and 431 GOLD FILM MERCURY VAPOR ANALYZERS

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1.0 SCOPE AND APPLICATION

The purpose of this Standard Operating Procedure (SOP) is to describe the operation, maintenance and functional test procedures for the Arizona Instrument Corporation, Jerome Division, Models 411 and 431 Gold Film Mercury Vapor Analyzers.

Both the Jerome Models 411 and 431 Mercury Vapor Analyzers, are designed for the analysis of mercury vapor in the workplace environment and for the identification of the location of mercury spills. Both instruments display results digitally, in units of milligrams of mercury per cubic meter of air, (mg Hg/m³). These are standard (i.e., typically applicable) operating procedures which may be varied or changed as required, dependent on site conditions, equipment limitations or limitations imposed by the procedure. In all instances, the ultimate procedures employed should be documented and associated with the final report.

Mention of trade names or commercial products does not constitute United States Environmental Protection Agency (U.S. EPA) endorsement or recommendation for use.

2.0 METHOD SUMMARY

The Jerome Models 411 and 431 Gold Film Mercury Vapor Analyzers both employ the same principle of operation. Metallic mercury present in an air sample is passed over a thin gold film which undergoes an increase in electrical resistance proportional to the mass of mercury in the sample. The gold film is selective in its adsorption of elemental mercury, thus; eliminating interferences common to ultra-violet (UV) mercury analyzers such as water vapor, particulates, cigarette smoke, and organic solvents. The Model 431 also includes a scrubber and acid gas filter in line with the gold film sensor to remove any acidic gases, which interfere with the sensor's response to mercury. Both models have a scrubber in line to capture mercury released during the regeneration of the Gold Film Sensor.

Both instruments may be operated in either a **SURVEY** or **SAMPLE** mode. The **SAMPLE** mode produces optimum accuracy with both instruments. The **SURVEY** mode is used to assess areas of potentially high mercury contamination.

Activating either the **SAMPLE** or **SURVEY** mode starts an internal pump which draws a precise volume of air over the Gold Film Sensor. The sensor adsorbs and integrates the mercury vapor and the measured concentration is then displayed on the digital meter in units of mg Hg/m³.

As mercury adsorbs on the sensor, the percentage of sensor saturation is displayed on the Model 411 by pressing the **SENSOR STATUS** button [with the 431 Model, the percentage saturation is represented during sampling on the digital display with a series of four horizontal bars, each illuminated bar representing an increase in sensor saturation from 0 to 25% (one bar) to 75-100% (four bars)]. Approximately 40 samples containing 0.1 mg Hg/m³ may be taken with the Jerome Model 411, operating in the **SAMPLE** mode, before the



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sensor reaches saturation, while approximately 65 samples, of the same concentration of mercury, can be taken with the Model 431 prior to saturation of the sensor. Following sensor saturation, the sensor must be regenerated using a heating cycle (15 minutes for the 411 Model and 10 minutes for the 431 Model) prior to the analysis of any additional samples. During the heating cycle, mercury desorbed from the sensor, is removed from the instrument flow system by a final scrubber, preventing contamination from the desorbed mercury.

The Model 411 portable instrument will operate approximately five hours on fully charged batteries, while the Model 431 will operate for approximately six hours. With both models, the **SAMPLE** mode provides an integrated, direct reading of mercury vapor concentration in units of mg/m³. The **SURVEY** mode allows quick checks to locate high concentration areas. The instrument's microprocessor automatically re-zeroes the digital meter at the start of each sample cycle and freezes the meter reading until the next sample cycle is activated; thus, eliminating drift between samples.

DIRECTORY OF DIGITAL METER DISPLAY CODES

<u>Digital Met</u> <u>Model N</u>	= =	Explanation
<u>411</u>	<u>431</u>	
.000	.000	Ready to Sample, or, Lack of Mercury reading.
н.н.н.	н.н.н.	Sensor Regeneration in Progress (.H.H.H Flashes).
.8.8.8	.8.8.8	For Model 411, Press SENSOR STATUS. If Digital Meter Displays 100, the Gold Film Sensor is Saturated. No Further Operation is Possible Until a Film Heat is Performed. If Digital Meter Does Not Read 100, the Sample was Over Range. Further Operation is Possible With Samples of Lower Concentration, or With the Use of a Dilution Module. For Model 431, Perform Sensor Regeneration.



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<u>Digital Meter</u> <u>Model Nur</u>		Explanation	
<u>411</u>	<u>431</u>		
LO BAT	LO BAT	Recharge Batteries.	
.L.L.L	TTT	For Model 411, Bridge Balance is Low. Perform Heat Cycle and Adjust Bridge Balance After Cycle. For Model 431, Perform Re-Zero.	
	.P.P.P	Power Cord Required	
	. HL	High Level, Sample Exceeded Maximum Sample Limit.	
For 411 When	Sensor Status Button Depressed		
. 10		10% Sensor Saturation	
. 50		50% Sensor Saturation	
.100		100% Sensor Saturation - Film Heat Required	
For 431 Durin	g Sampling		
		0 - 25% Sensor Saturation	
		25 - 50% Sensor Saturation	
		50 - 75% Sensor Saturation	
	-,	75 - 100% Sensor Saturation	
For Model 431	1 When Zero is Depressed (this applie	s only after a Sensor Regeneration)	
	. 0	Zero, Ready to Sample	
	. Н	High, Turn Zero Pot Counterclockwise	
	. L	Low, Turn Zero Pot Clockwise	



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3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

This section is not applicable to this SOP.

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

- The presence of acid gases in the sampled air stream may cause interferences.
- Organic mercury compounds, such as dimethylmercury, will interfere with the measurement of metallic vapor phase mercury.

5.0 EQUIPMENT/APPARATUS

The following equipment is required for the operation of the Jerome Models 411 and 431.

- Instruction Manuals (For Model 411 *OR* Model 431)
- Power Cord (6000-4003, Same for both Models)
- Battery Charger (4000-1003 for Model 411; 4000-1011 for Model 431)
- Spare Battery Pack Assembly (Z4000-0901 for Model 411; Z4000-0907 for Model 431)
- Small Screwdriver for adjustments
- Tygon tubing One foot of C" I.D.
- Dosimeter Lead Set (2100-6005 for Model 411; 2100-6017 for Model 431)
- Data Logger Interface Cable (For Model 431 6000-1056)
- Data Logger (For Model 431 6100-0010)
- Jerome Communications Interface Software (For the Data Logger and Model 431, S/N 200,306)
- Trimmer Tool (2300-0001, Same for both Models)
- Extension Probe , used to locate mercury vapor in hard to reach places (1400-2002, Same for both Models)
- Zero Air Filter (Z2600-3905, Same for both Models)
- Scrubber Filters (2 for Model 431 Z2600-3930)
- Intake Filter Disks (13 mm for Model 411 2600-3001; 0.25" for Model 431 2600-3039)
- C/M Filter (2600-3928 for Model 431)
- Hg Exhaust Filter (A2600-3918 for Model 411)
- Tubing Adapter (1400-3010, Same for both Models)

Note: Battery Recharge requires 16 hours for Model 411 and 14 hours for Model 431.

6.0 REAGENTS

The Vapor Calibration Kit for Model 411 and the Functional Test Kit for Model 431 both contain liquid metallic mercury. No other reagents are required.

7.0 PROCEDURES



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7.1 Preparation

Check out and ensure the proper operation of the Gold Film Mercury Vapor Analyzer by performing the following steps:

- 1. Press **POWER ON**. [Digital meter displays **.000**. (Disregard digital meter's momentary readings.) Recharge or replace the battery pack if the **LO BAT** indicator <u>remains on</u>.]
- 2. Perform **FILM HEAT** (Model 411) or **SENSOR REGENERATION** (Model 431). For Model 411, press and hold down the **SENSOR STATUS** and adjust the **BRIDGE BALANCE** until the digital meter reads between **02** and **06**. For Model 431, while pressing **ZERO**, turn the **ZERO ADJUST** until the digital meter reads <u>. 0</u>.
- 3. Press **SAMPLE**. The Model 411 digital display will show E01 through E09 during the 10 second sample collection. At the end of the 10 second cycle, the digital meter displays the mercury concentration in mg/m³. The Model 431 digital meter displays a bar () which indicates the amount of sensor saturation and at the end of its 12 second cycle, the digital meter displays the mercury concentration in mg/m³.
- 4. The digital meter display will read between 0.003 and 0.000 if the Analyzer is operating properly.

7.2 Sampling for Mercury

After performing a **FILM HEAT** or **SENSOR REGENERATION**, allow the instrument to stabilize for 20 minutes to ensure maximum sample accuracy.

7.2.1 Sample Mode

The **SAMPLE MODE** produces optimum accuracy and is the **recommended** sampling mode for routine monitoring.

- 1. Press **SAMPLE**.
- 2. At the end of the sampling cycle read the digital meter. The number displayed at the completion of the sampling cycle is the mercury concentration in units of mg/m³. The digital meter automatically zeroes at the start of each sampling cycle.
- 3. For the Model 411, occasionally check the SENSOR STATUS. For the Model 431, the bar or bars shown on the digital display during the sampling cycle, indicate the current percentage of sensor saturation. When the sensor is completely saturated, the digital meter displays .8.8.8 instead of a value. This indicates SENSOR REGENERATION must be performed.



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 Press power OFF when sampling activities are completed and the instrument will not be used.

7.2.2 Survey Mode

The **SURVEY MODE** does not provide accurate analysis of mercury concentrations. This mode is to be used to locate mercury spills or to assess areas of potentially high mercury concentrations.

For Model 411

- 1. Press **SURVEY**.
- 2. Read digital meter.
- 3. Occasionally check **SENSOR STATUS**.
- Press power OFF when sampling activities are completed and the instrument will not be used.

For Model 431

- 1. Press and <u>hold</u> **SAMPLE**. The instrument takes a normal sample, displays the concentration and then goes into **SURVEY MODE**. The display flashes the concentrations approximately every three seconds.
- 2. When you are finished surveying, <u>release</u> **SAMPLE**. The final survey value remains displayed until the next sample is taken.
- 3. Approximately 650 samples at mercury concentrations of 0.1 mg/m³ may be collected before a sensor regeneration is required.
- 4. Press power OFF when sampling activities are completed and the instrument will not be used.

A probe may be plugged directly into the instruments intake to aid in locating mercury vapor in hard to reach places. The Jerome Models 411 and 431 are intended for vapor use only. **DO NOT** allow the probe or the instrument's intake to come in contact with liquids, dust or other foreign material.

7.3 Operating on Battery Power



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battery power is necessary for your use, please be aware of the following:

- A fully charged battery pack provides power for 5 continuous hours of operation for Model 411 and 6 hours for Model 431.
- 3. For operations lasting longer than 5 or 6 hours, additional fully charged battery packs are required.
- 4. If **LO BAT** appears in the digital display, replace the battery pack.
- 5. Complete battery recharging requires 14 to 16 hours.

7.4 Operating on a Power Supply or AC Power

The Jerome Models 411 and 431 employ different mechanisms to permit stationary use using AC power.

7.4.1 Model 411

For stationary use, the optional Continuous Operation Power Supply Kit (COPS) is available. The COPS kit eliminates the need for the battery pack and its necessary maintenance. Use the following installation steps:

- 1. Unplug the line cord.
- Remove the two side screws from the digital meter end of the instrument and open the case lid.
- 3. Locate the battery jacks on the right side of the instrument, toward the rear (with the sampling end of the instrument facing forward). Unplug and remove the battery pack from the instrument.
- 4. Plug the jumper assembly into the instrument battery jack, close the case lid and replace the two side screws. [The jumper assembly is included with the COPS kit.]
- 5. The power supply can now be plugged into the battery charger receptacle on the rear of the Model 411. [When the power supply line cord is plugged into an AC source, the instrument is ready for use.]

WARNING!!! With the COPS jumper assembly installed in the Model 411, the battery charger should not be plugged into the charging jack. The battery charger does not supply adequate current to operate the instrument and damage to the instrument and/or battery charger will result.



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7.4.2 Model 431

For stationary use, the Model 431 may be operated on AC power. If preferred for this type of use, the battery pack may be unplugged and removed completely. Operating the instrument only on AC power eliminates the need for the battery pack and its necessary maintenance.

7.5 Preventive Maintenance Calendar

To keep the Jerome Models 411 and 431 operating at peak performance, follow this maintenance schedule:

1. Charge Batteries After one month of storage, at the end of

day's use, or when LO BAT appears. Replace batteries when they no longer maintain their

charge.

2. Change Intake Filter Disc Weekly or as needed.

3. Change Internal Filters (Model 431) After six months of use or as needed.

4. Change Mercury Exhaust Filter Annually

(Scrubber)

1. Replace Zero Air Filter Annually

2. Perform Calibration (Model 411) After 20 hours of use or Every Three

Or Functionality Check (Model 431) months.

3. Send out for Factory Calibration Annually

NOTE: Plug the **ZERO AIR FILTER** into the instrument's intake during storage.

7.6 Calibration and Functional Test Procedures

7.6.1 Model 411

The purpose of the calibration check, as part of the routine maintenance program, is to verify proper operation of the instrument. If calibration check results fall within the expected range, you may assume the instrument is maintaining its calibration. The Vapor Calibration Kit, part number Y411-0902, is required for this procedure.



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NOTE: The calibration check should only be performed after a **FILM HEAT**.

Procedure:

- Leave calibration vessel at stable room temperature for at least 2 hours.
 [Temperature range for the calibration check is 18 22 °C. Temperature fluctuations during the calibration check procedure will produce erratic results.]
- 2. Unplug line cord and battery charger.
- 3. Replace intake filter disc.
- 4. Check flow rate.
- 5. Replace septum.
- 6. Plug septum assembly into the instrument's intake.
- 7. Attach **ZERO AIR FILTER** to septum assembly.
- 8. Press **POWER ON**.
- 9. Note temperature of calibration vessel.
- 10. Inject 1 cubic centimeter (cc) of mercury vapor.
- 11. Record the meter reading.
- 12. Repeat step 10 three times. [The last three 1cc injections should be within +/- 5% of each other.]
- 13. Refer to the Temperature Conversion Chart below for the acceptable result range. [The average of the last three digital meter readings should fall within the range indicated on the chart. If so, the Model 411 is in calibration. If the average is not within range, proceed to the next step.]
- 14. Perform **FILM HEAT**. [Wait 1 hour before proceeding to step 15.]
- 15. Adjust **BRIDGE BALANCE** using trimmer tool until digital meter reads not less than 02, and not greater than 06.
- 16. Repeat calibration procedure. [If the average of the digital meter readings is still not within range, refer to the Model 411 Operation Manual, Calibration Check Trouble Shooting Section in Appendix A.]



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TEMPERATURE CONVERSION CHART - MODEL 411

Temperature °C	Digital Meter Response	
16	.064 to .086	
17	.070 to .094	
18	.076 to .102	
19	.082 to .112	
20	.090 to .122	
21	.097 to .131	
22	.105 to .143	
23	.115 to .155	
24	.124 to .168	

7.6.2 Model 431

Use this test if your application requires frequent verification of instrument functionality. If the test results fall within the expected range, you may assume the instrument is functioning properly. This test $\bf DOES\ NO\ T$ calibrate the instrument. The Functional Test Kit, part number Y431 - 0902, is required for this procedure.

NOTE: Perform the functional test $\mbox{\bf ONLY}$ after a $\mbox{\bf SENSOR}$ $\mbox{\bf REGENERATION}.$

Procedure:

- 1. Leave the thermos at stable room temperature for at least 2 hours. The temperature range for the test is 18 22 $^{\circ}$ C. Temperature fluctuations during the test procedure will produce erratic results.
- 2. Replace the intake filter disc.
- 3. Replace the septum.



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- 4. Plug the septum assembly into the instrument's intake and tighten the intake tube nut to ensure an airtight seal.
- 5. Attach a **ZERO AIR FILTER** to the septum assembly.
- 6. Press power **ON**.
- 7. Take 3 samples. If the average meter reading is less than .005, continue to step 8. If the average meter reading is greater than .005, stop here and refer to the Model 431 Operation Manual, Functional Test Trouble Shooting.
- 8. Note the temperature of the thermos.
- 9. Inject 1cc of mercury vapor.
- 10. Record the meter reading.
- 11. Repeat steps 9 and 10 three times. The results from last three 1cc injections should be within +/- 5% of each other. If not, refer to the Model 431 Operation Manual for proper syringe technique, and repeat the procedure.
- 12. Refer to the Temperature Conversion Chart given below for the acceptable range of results. The average of the last three digital meter readings should fall within the range shown in the chart. If the average is within the range, the JEROME 431 is functioning properly. If the average is not within range, proceed to the next step.
- 13. Perform **SENSOR REGENERATION.** While pressing **ZERO**, turn the **ZERO ADJUST**, using the trimmer tool until the digital meter reads <u>0</u>.
- 14. Wait 1 hour before proceeding to step 15.
- 15. Repeat steps 9 to 12 of this procedure. If the average of the digital meter readings is still not within range, refer to the Model 431 Operation Manual, Functional Test Trouble Shooting Section in Appendix B.



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TEMPERATURE CONVERSION CHART - MODEL 431

Temperature °C	Digital Meter Response
16	.091 to .123
17	.100 to .135
18	.108 to .146
19	.118 to .159
20	.129 to .174
21	.138 to .187
22	.151 to .204
23	.164 to .222
24	.177 to .240

8.0 CALCULATIONS

The Jerome Models 411 and 431 are direct reading instruments. The readings are displayed in units of mg Hg/m^3 and encompass the range from 0.001 to 0.999 mg Hg/m^3 .

9.0 QUALITY ASSURANCE/QUALITY CONTROL

There are no specific quality assurance activities which apply to the implementation of these procedures. However, the following general QA procedures apply:

- 1. All data must be documented on field data sheets or within site logbooks.
- 2. All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer unless otherwise specified in the work plan. Equipment checkout and calibration activities must occur prior to sampling/operation, and they must be documented.

10.0 DATA VALIDATION

This section is not applicable to this SOP.



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11.0 HEALTH AND SAFETY

When working with potentially hazardous materials, follow U.S. EPA, OSHA, or corporate health and safety practices. Dispose of used filters and scrubbers in accordance with proper disposal procedures.

MSDS documents are included in $Appendix\ C$ for metallic mercury and chemical constituents of the sampling train scrubber and exhaust filter components.

12.0 REFERENCES

Arizona Instrument Corporation, Jerome Division. 1989. Jerome⁴³¹ Mercury Vapor Analyzer Operation Manual.

Jerome Instrument Corporation. 1986. *Jerome*⁴¹¹ *Mercury Vapor Analyzer Operation Manual*.

13.0 APPENDICES

- A Calibration Check Troubleshooting
- B Functional Test Troubleshooting
- C Material Safety Data Sheets

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APPENDIX A
Calibration Check Troubleshooting
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CALIBRATION CHECK TROUBLE SHOOTING

If the proper results were not achieved during the calibration check procedure, go over the following to discover the cause:

- A. Ensure battery charger and line cord are unplugged.
- B. Perform a flow rate check, procedure page 9.
- C. Ensure calibration vessel temperature is stable.
- D. Ensure calibration vessel mercury drop is not oxidized.
- E. A clogged, bent, or contaminated syringe needle should be replaced.
- F. If the internal tubing is crimped or blocked, straighten or replace affected tubing.
- G. Ensure instrument's intake is not blocked with foreign matter.

If none of the above conditions exist, follow these steps to determine if the flow system is contaminated:

- Attach zero air filter.
- Press SAMPLE 3 times.
 If the average reading is less than .005, there is no mercury contamination. If still greater than .005,
- Replace zero air filter.
- Press SAMPLE 3 times.
 If average reading is less than .005, the old zero air filter was contaminated. If still greater than .005,
- Change internal filter system. [Refer to page 10.]
- Press SAMPLE 3 times.
 If average reading is less than .005, the internal filter was contaminated. If still greater than .005,
- Please call Technical Service, Toll Free (800) 952-2566 for assistance.



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APPENDIX B
Functional Test Troubleshooting
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FUNCTIONAL TEST TROUBLESHOOTING

If you don't achieve good results with the test procedure, go over the following:

- Ensure the thermos temperature is stable.
- Ensure there is no oxidation on the mercury drop in the thermos.
- Ensure the instrument's uptake is not blocked with foreign matter.
- Straighten or replace crimped or blocked internal tubing.

and...

• Use a new syringe needle.

If you find the above does not solve your problems, follow these steps to determine if your flow system is contaminated:

- 1. Insert your zero air filter in the instrument's intake and tighten the intake tube nut to ensure an airtight seal.
- 2. Take 3 samples.

If the average meter reading is less than .005, there is no mercury contamination. If the average meter reading is greater than .005, proceed to step 3.

- 3. Remove and replace the zero air filter.
- 4. Take 3 samples.

If the average meter reading is less than .005, the old zero air filter was contaminated. If still greater than .005, proceed to step 5.

- Change the internal filters.
 Refer to page 12 of the 431 Manual.
- Take 3 more samples.
 If the average meter reading is less than .005, the internal filters were contaminated.

If the average is still greater than .005 –

Please call Customer Service, Toll Free (800) 528-7411 for help.



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APPENDIX C
Material Safety Data Sheets
SOP #2136
March 2001



4-1-88 Date of Issue SAFETY DATA SHEET MATERIAL

Cupric Suffate

Tenure Arizona 65280 P.O. Bux 1830 ARIZONA INSTRUMENT CORPORATION

PINDUCT NAME: Cupric Duffete, 5-Hydrate Product iden:if astion: INFORMATION HOTLINE (900) 528 7411

PRODUCT CODES: 1844, 1841, 1848, 1849 CHEMICAL FORNILLA: CuSO4-5H2O MOLECULAR WEIGHT: 240,85 FORMULA CAS NOT 07788 B6 9 Blue Vinial EYNONYME: Copper Guiteta, Pantahydrale,

Section 1 - Physical Data

SOLUDILITY (FIgO): Appresiable (more than MELTING DOINT: 110°C (200°C) VAPOR DENSITY (AIR = 1); 0.5 or granules BOILING POINT: 100°C (302°C) APPEARANCE & ODOF, Odoress blue crystals

SPECIFIC GEANTY; 2,28 10%)

Hezerd Date Section 2 - Fire and Explosion

EXPLOSIOM: Closed containers expected to амау пош веяс FIRE: Produces toxic ças - salfur dioxide, keep

sneed it it can be done without risk, if not, use apparatus, incre exposed containers from fire ing & NECSH approved self-contained breathing propriate for surrounding fire, full protective doth-PIRE NezaRD: Use extinguishing media spreat may explode.

water to keep fire-exposed containers cool.

Section 8 - Reactivity Data

அமா INCOMPATIBILITIES: Strong reducing egents. DECOMPOSITION PRODUCTS: Oxides of CONDITIONE TO AVOID: HORE STABILITY: Slable, no hazardoza polymerization.

Information Section 4 - Leak/Spill Dispose:

SUDERINGAL ERUSHINGLAL & REIGNA

Sepage of in accordance with level state & DISPOSAL: Transfer to plean, dry container & flush sall area with water. espitatoly protection, second up apilled material, PRODUCT CLEAN-UP: Protective clottiling &

Section 5 - Health Hazard Information

Eyes- in mediately flush with water for 15 min. PIRST AID: <u>Ingestor</u> - get medical attention, T conscious, mimediately include vomiting. <u>Skin</u> S vo missy, or gastrointestinal pain. causa demialitis, ingestion may cause nausea, may deuse imitation, prototoged exposure may dust may ulcerate murcuis membrades, corrant OVEREXPOSURE PEFFCTS: Skin or eyes -ന്നൽ (ബംധാനമർ) യർഗർ - ദേ TOX CITY: LDs. (oral-rat) mg/kg - x00 THRESHOLD LIMIT VALUE (71 V/TWA): Ingm*

Information Section 6 - Special Protection

Teimicination of

Wear rubbar glaves & eye protection fons are high, use respirator or cust mask. meet TLV requirements, if airborne concentra-Use adequate general or local ventilation to

Information Section 7 - Storage and Special

general chemical storage area. Keep in tightly closed contained Suitable for any

тейвисе эрон тійв інбетлежен. то до выл еди слод бодуляв. земвовуварм will Arizona instrument Corporation be responsible for damages of any name for their ourposess prior to use, its no event their own detentiviation as to its solubility that the persons receiving same will make илонтавъп Is зизрией ирол тъе селеноизы этирияличия от асписасу тесеот вис CHERT FULL BUILD IN THE SAME THE TO bereat Adams barament Cognitional gette ed in se mento ed til bavalled toat ferein are presented in good faith and Тав Ілфигавол яли песитивлиялиля ке-

THE OPERATION OF THE JEROME MODELS 411 and 431 GOLD FILM MERCURY VAPOR ANALYZERS

STANDARD OPERATING PROCEDURES

REV: DATE: 03/08/01

U. S. EPA ENVIRONMENTAL RESPONSE TEAM

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4-1-88 Date of Issue SALETY DAIN SHEET MATERIAL

Mallcosorb

MEOUTH HOLLINE (800) 828 7411 Temps, Arizova 35200 P.O. B.M 1930 ARIZONA MISTRUMENT CORPORATION

MOLECULAR WEIGHT: NA *OFIMBLA CAS NO.: 8005-28 8 pixed with lime SYNONYM3: Goda lime solid; acdlum hydroxide Product Identification:

CHEMICAL FORMULA: NA HAZARCOUS INCREDIENTS: N/A

Section 1 - Physical Data

SPECIFIC GRAVITY: No information found. VAPOR PRESSURE @ 20°0; Essantially zaro MELTING POLITY, No lifform salon found BOILING POINT: No information found CDOF: COORESS APPEAFANCE White cultquescent peters

Section 2 - Fire and Explosion Data

EXPLOSION: Possible wifen in contact with inmay garrenate heat to ignite compustbles FIRE: Not combistible, contact with moisting

approved self-contained breathing apparatus. ocmpatible materials. FIRE HAZARD: Full protective clothing & NIUSK

Section 3 - Resodvity Data

tion of flammable hydrogen gas. contact with aluminum, tin & zine cause forths. fluorine & many organics; controt with tith own: pounce cause ormation of shock-denative colle; INCOMPATIBILITIES: Weter, steam, doice, tion procues or hazardous polymeration STABILITY: Deuses no hazardous docomposi-

Information Section 4 - Leak/Spill Disposal

evoid dusting, neutralize traces with dilute acid. reaptratory protection, aboop up apilled material, PRODUCT CLEANUP: Protestive obtiling &

> dispose of according to focal, state 8 fedbral regulations, DO NOT CONTACT WITH WATER. DIGPOSAL: Transfer to closed metal containor \$.

> > _

Section 5 - Health Hazard Information

Caldiom Oxide 2 mg/m² (TWA) ACCH Theshold HrithValue (T.V): Sodium Hydroxice 2 Inglin² (TVA) Calcion Civida 5 mg/m² (TWA) Sociem Hydroxida 2 mg/m² (TWA) OSHA Formestive Exposure Limit (FEL.):

മട്ടെ ജ്ലോല്ലൾ: & eyes - infration or severe purris, possible blinksevere tissue scarring & death may moult; skin gestion - severe mounn, throat & significal buring, upper respiratory tract camage, presumptitis; in-EXPOSITEDATED TH PEFFCTS: Intaktion

renton immediately. Skin & Eyes- immediately filish with water thr 15 min. minimum; remove targa quantifies of water or milk; get medical at-EXPESSION - FICH NOT INDUCE VOMITING! GIVE nor presiding, give artificial respitation; if bresshing is difficult, give mygen; ger medical attention. FIRST AID: Intabilion - remove to fresh all: II

Information Section 6 - Special Profestion

canamina ed clombig.

rubbei glozes & eys protection. Vertillation must be sufficient to mee, TLV, Wear

Section 7 - Storage and Special

Dated area, away from incompatible substances. Keep in tightly closed container, in coci, dry ven-

Religiose ribora sura recomasponi responsible for damages of any nature relations you resulting from the use of an mil Augura Instrument Corporation be for their purposes prior to use, in no event their own determination as to its suitability the completeness of absulacy thereof and intermetion to supplied upon the condition that the poisons tocowing came will make homever, makee no representations as to howest, Appena Instrument Cerporation, political to be correct as of the date by a fifted boong is, bothcoole are alored digit The Information and recommendations set

THE OPERATION OF THE JEROME MODELS 411 and 431 GOLD FILM MERCURY VAPOR ANALYZERS

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U. S. EPA ENVIRONMENTAL RESPONSE TEAM



MATERIAL SAFETY DATA SHFFT Oate of Issue 4-1-88

Resisorb - Mercury Vapor Absorbent

ARIZONA INSTRUMENT CORPORATION 2.0. Box 1930 Tompo, Arizona 65260 INFORMATION HOTI INF part; 524-2411

Product Identification:
PRODUCT NAME: Resisorb - Mercury Veger Abco-tem:

FCRAULA CAS ACI: 2C08D-00-0 MOLEGULAN WEIGHT, JO CHEMICAL FORMULA: Proprietary Mixture PRODUCT CODICS: 4405

Section: 1 - Physical Data

APPEARANCE & ODOF: Black solid with Halogen-like odor

Malogeniika odor Bolling Poliviti N/A Melting Poliviti N/A VAPOR PRESSURE: N/A SPECIFIC GRAVITY: N/A

Section 2 - Fire and Explosion Hazard Data

FRE: Combustible, keep, away from hisat, sparks, flame.

sparks, flame, EXPLOSION: Contact with strong oxidizers may cause explusion.

FIRE I MZARD: Use water spray to soat, utess A extinguisher, full protective civiliting & NIOSH approved self-contained presching applaiatus; move exposed containers from the streatifit rature be done without risk. If not, use water to keep fire-exposed containers cool.

Section 3 - Repotivity Date

STABILITY: State, to hazardous polymerisation CCNDHITORS TO AVOID: Heal, Hame, sources of ignition

NGCIMPA (IB LITIES: Strong exidizing agents, titud acid, ammonia, a kali metale, strong reducing agents.

Section 4 - Leak/Spill Disposal Information

PHODUCT CLEAN-UP: Protective clathing & respiratory protection, scoop up spilled material, away duebug, such spill area with water. DISPACED Transfer to clean, dry container & dispose of in accordance with local, state & federal anvironmental regulations.

Section 5 - Health Hazard Information

OVERBOTOOSURE STITCOTS: Dust may crite: a skin or obes, inneleiton may cruse sigituress & abido or obes, inneleiton may cruse sigituress & abido application may ceuse neutety, vortition, insufactions; insufaction may ceuse neutety, vortition, insufaction, faller A.D. Ingestion - get medical attention, factorious, inmodiately nature verifing. Skin & syses immed abily fush with waterfor: 15 min. minimum; romeyer contaminated stating.

Section 6 - Special Protection <u>Information</u>

As acequate general or local vorigiation to keep tume or dust levels as ew as possible. If allocine concentration is high, use respirator or dust made. We'sn' rubber gloves & cye protestion.

Section 7 - Storage and Special information

Keep in tylitty closed scritainer, in scot dry verillated area, away from heat, sparks or flame, factate from incompatible substances.

The Internation and recommendations set tout Leadin are presented in good fath, and believed to the connect as of the dair leview. All are instrument Corporation forware, makes in representators as a florest makes in representators as a like curvaleteress or ancuracy thereof and the curvaleteress or ancuracy thereof and the persons receiving settle persons receiving settle with make that the persons receiving settle with make that the persons receiving settle in the curvaleterest and the fact that persons received as to be substituted for their purposes point to use and no event that factore instituted the test of or expensive treathing from the test of or release treathing from the test of or release upon this information.

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